

## About Refreshable Braille Displays (iPad Manual Notes )

Notes: Manual definitions and observational interpretations.

- Contracted Braille - Meaning Grade 2 Contracted Braille
- Un-contracted Braille or 8 dot Braille - ASCII or Computer
- Interact with an item - Meaning selecting the button by pressing the corresponding router key on the Braille display aka press any router key within the word display. VoiceOver announces these as buttons. It will also give hints i.e. double tap or press to enable more actions. Enabling or disabling hints is located in VoiceOver Settings.
- router keys on a Braille display - router keys on your Braille display are located on each cell of the display typically located above the actual raised Braille cell and tactually identifiable as a raised circle. Thus 18 cell display 18 router keys. Router keys are like using a touch screen, if it says press add its means push on the word add displayed in Braille on the Braille display.

If you have a supported Braille display connected to (or in the case of a Bluetooth display, paired with) your computer, VoiceOver automatically detects it and sends it information about what is displayed on the screen. You can connect multiple Braille displays to your computer and each display will mirror the same content at the same time, which can be useful in a classroom setting.

***By default, VoiceOver displays un-contracted Braille/computer Braille.*** You can set a preference to use contracted Braille, in which case VoiceOver dynamically changes the display under the cursor from contracted to un-contracted Braille, so that you can read and edit more easily, and then changes back to contracted Braille when you move the cursor. ***For example, If you move the Braille display cursor by pressing the router key (anywhere within the word) the word will change from contracted Braille to un-contracted Braille or spells out the whole word. To change the word back to contracted Braille move the Braille display cursor by pressing the router key (anywhere on the display but that word).***

***The text displayed on the*** Braille display ***contain more than just the contents of the VoiceOver cursor text your reading.*** It describes the contents of the entire line on which the VoiceOver cursor is focused, including items to the left and right of the VoiceOver cursor. ***This does not always happen if the status cell is not enabled in the VoiceOver Braille Settings to display the status cell right or left end of the Braille Display.*** For example, when the VoiceOver cursor is focused on an ***item/element in an open App, the Braille display displays more than just text to read it displays menu bars, tools bars, checkboxes, pop-up menus, icons, and buttons. More information is displayed in the status cell located on the far right or left side of your Braille display provided you enabled it.*** This collection of items—the VoiceOver cursor and the items to its left and right on the same horizontal line—make up a “line” of Braille. ***They make up a tactual line of Braille within the cell limit of your device For example the RefreshaBraille 18, only displays 18 Braille cells at a***

***time. Think of Braille cells as letters and spacing. That's 31 Braille cells of contracted Braille (like short hand). So if you only get to read 18 cells at a time you would see: Think of Braille cells. Thus to read the rest of the sentence you have to press the right advance key.***

When you **interact** with an item in the VoiceOver cursor to get more detail about it, the Braille description changes to provide more detail as well. **Interact with an item - Meaning selecting the button by pressing the corresponding router key on the Braille display aka press any router key within the word display. VoiceOver announces these a buttons. It will also give hints i.e. double tap or press to enable more actions. Enabling or disabling hints is located in VoiceOver Settings.** For example, if you move the VoiceOver cursor onto a toolbar, VoiceOver describes your cursor location by speaking the item/button name ***and your Braille Displays that item/button name on the Braille display. Because*** toolbars stretch the entire width of a window ***you'll need to navigate within them using move to next or previous element.*** When you interact with the toolbar, the Braille display describes each item in the toolbar from left to right.

VoiceOver raises dots 7 and 8 to indicate the position of the VoiceOver cursor, to help you locate it within the line of Braille. ***For example, once VoiceOver completes reading a text selection dots 7 and 8 will flash to indicate your cursor location. Note while VoiceOver is reading a selection of text dots 7 and 8 will not move word by word on the Braille display. (You can turn off this feature in VoiceOver Utility).*** Similarly, when you're editing or selecting text, the text selection is represented by dots 7 and 8. VoiceOver also indicates the position of the text selection cursor, called the "I-beam," by flashing dot 8 of the Braille cell preceding the text selection cursor and dot 7 of the Braille cell trailing the text selection cursor. ***For editing text remember you always press the router key on the Braille display located one Braille cell to the right of the word or letter you want to delete or insert.***

VoiceOver provides additional information about what's on the screen using three status cells. Each status cell provides a designated type of information. You can set preferences for the number of status cells you want to use and their location on the Braille display. For example, you can choose to use the cell that shows text status and set its location to be on the left of your display.

You can use the Braille display while listening to VoiceOver speak, or you can mute the speech. If your Braille display has a Perkins-style keyboard, you can type on it.

Pairing a Bluetooth Braille display

Before you can use a supported Bluetooth Braille display with VoiceOver, you must pair your Braille display. You can pair only one Bluetooth Braille display at a time. You pair the display only once; it remains paired until you remove it from the pairing. After your Braille display is paired, VoiceOver detects it whenever it's turned on and within range; if it's your primary Braille display, you can then use it.

**See document VoiceOver - Connecting iPad to Bluetooth Device for detailed instructions.**

To pair a Bluetooth Braille display with VoiceOver:

1. When VoiceOver is on, open VoiceOver Utility by pressing VO-F8.
2. Click the Braille category, click Displays, and then click the Add (+) button.
3. Select your Bluetooth Braille display in the list.

VoiceOver filters the devices it detects to list only the Bluetooth Braille displays that are within range of your computer and that appear to match a VoiceOver Braille display driver.

4. Click Select.

You may be asked to provide a pairing passcode (such as 0000 or 1234, two common default codes). Check the documentation that came with your Braille display for the passcode.

If the Bluetooth Braille display you selected in the list doesn't work with VoiceOver, it's likely that its driver doesn't match a VoiceOver driver. Try pairing a different Bluetooth Braille display.

If your Bluetooth Braille display isn't listed, make sure you have set the display to be discoverable. For more information, check the documentation that came with your Braille display.

### **About panning on a Braille display**

Sometimes a line of Braille is too wide to fit on the Braille display. You can "pan" the line by pressing the left and right buttons on the display to move through the line. Each left or right pan moves according to the number of cells (including status cells) your display contains.

When you move the VoiceOver cursor using the VoiceOver keys, the Braille display automatically pans when necessary to follow it, even wrapping to the previous or next line.

### **Using router keys on a Braille display**

- **Router keys on a Braille display - Router keys on your Braille display are located on each cell of the display typically located above the actual raised Braille cell and tactually identifiable as a raised circle. Thus 18 cell display 18 router keys. Router keys are like using a touch screen, if it says press add its means push on the word add displayed in Braille on the Braille display.**

Many Braille displays have router keys above the Braille cells that you can use to move the cursor. Generally, you press the router key above a particular item in the line of Braille to move the VoiceOver cursor or selection to that item.

Pressing a router key over a control moves the **VoiceOver cursor to that control, and speaks the control name** if the VoiceOver cursor is not already there. If the VoiceOver cursor is already on that control, **(look for flashing dots 7 & 8)** pressing the router key performs the control's default action (**i.e. open App or tap to hear more item choices**). **For example, to change documents in the App Pages, you must click on Documents. Your Braille display will show the words "documents button" not just documents. Why....because it visually looks like a button and the App developer labeled it.** You could press router key to move the VoiceOver cursor to the button and then press the router key again to click the button. You would not have to touch the computer's keyboard at all. ***While reading or navigating text using a Braille display you press a router key and the VoiceOver cursor move to that location in text. (Visual Cursor on the screen and dots 7 & 8 on your Braille display. This is a useful tool to share your work with your sighted peers as you could press a router key to move the VoiceOver cursor providing them with the visual location on screen.***

**You can also press the router key above a status cell to display an expanded Braille description of each dot in the cell. To exit the description, press any other router key.**

Using status cells on a Braille display

The content of the line on the screen where the VoiceOver cursor is focused appears in the cells of the Braille display. VoiceOver uses status cells to provide additional information about the line, such as the text attributes. **(font, style, etc)**

If your Braille display has dedicated status cells, VoiceOver uses those cells to show the additional information, based on the preferences you set in VoiceOver Utility.

**Otherwise, VoiceOver uses the first one to three cells on the left or right of the display, based on your preferences.** VoiceOver reserves another cell, which it leaves blank, as a separator between the status cells and the other cells. **Thus given the status cell is set on the right, while using the Braille display the first 3-4 Braille cells would contain status information the Braille display.**

### **Here are ways to use status cells:**

If you set the preference to show the general display status, it shows status about VoiceOver, the Braille display, and the system.

For example, **dots 1 and 2 indicate unread and read announcements, and dots 7 and 8 indicate you can pan the display left or right.**

If you set the preference to show the text style status cell, it shows common text styles, such as bold or italic font.

For example, dots 1 and 2 indicate bold and italic text respectively, and dot 4 indicates the selected text is misspelled.

If you set the preference to show the extended text style status cell, it shows less common text styles.

For example, dots 1 and 2 indicate text is superscript or subscript respectively, and dot 5 indicates the selected text has a double underline.

Press the router key above a status cell to display an expanded Braille description of each dot in the cell. To exit the description, press any other router key.

If you didn't set any status cell preferences, status is not shown, and all of the reading cells are used to show the content of the current line.

## Reviewing announcements on a Braille display

VoiceOver sends announcements about events that are not represented visually on the screen to the Braille display. For example, if an application running in the background needs attention or if a new window appears onscreen, VoiceOver sends an announcement to the Braille display.

VoiceOver stores up to 30 announcements in the history; the most recent announcement is the first one. If you set a preference to use the status cell that shows general display status, you can review announcements.

Here are ways to review announcements:

On the status cell that shows general display status, dot 1 indicates whether there are new unread announcements. Dot 2 indicates whether the current announcement has already been read.

If you mapped a key to the Announcement History command, press that key to show the most recent announcement in the reading cells. Use the Up Arrow and Down Arrow keys to cycle through announcements.

To cycle through the announcement history, press the Up Arrow key to move backward to the oldest announcement, and press the Down Arrow key to move forward to the most recent announcement.

When you're done reviewing announcements, press any router key above the announcement to redisplay the current line.

## Assigning Braille display keys to VoiceOver commands

VoiceOver detects whether your Braille display provides input keys and assigns common VoiceOver commands to the keys. In this way, it helps you work more efficiently by using the computer keyboard less. For example, VoiceOver might assign the Down command to the D3 key; when you press that key on your Braille display, the VoiceOver cursor moves down one line on the screen. You can change the default assignments and add your own.

To assign input keys to commands:

With your Braille display connected to or paired with your computer and with VoiceOver on, open VoiceOver Utility by pressing VO-F8.

Click Braille in the category table, click Displays, select the Braille display you want to assign commands for, and then click Assign Commands.

Choose the VoiceOver command you want to assign to input keys.

For an existing assignment, choose a command from the pop-up menus in a row.

For a new assignment, click the Add (+) button to add a row to the list, and then choose a command from the pop-up menus in the row.

Press Command-B to save the assignment.

After you press Command-B, you'll have about five seconds before VoiceOver saves the assignment. A sound effect counts down the seconds.